



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,160	09/12/2003	WEN-PIN CHIU	11439-US-PA	2159
31561	7590	08/14/2006		
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE 7 FLOOR-1, NO. 100 ROOSEVELT ROAD, SECTION 2 TAIPEI, 100 TAIWAN				
			EXAMINER MCDONALD, RODNEY GLENN	
			ART UNIT 1753	PAPER NUMBER
DATE MAILED: 08/14/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/605,160

**Applicant(s)**

CHIU, WEN-PIN

**Examiner**

Rodney G. McDonald

**Art Unit**

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 7-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 11 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Sandhu (U.S. Pat. 6,752,912).

Regarding claim 11, Sandhu teach producing ionized metallic atoms inside a reaction chamber and accelerating the ionized metallic atoms at a first acceleration rate towards a wafer due to the bias applied to the wafer. The ionized metallic atoms can be titanium. (Column 7 lines 4-32; Abstract; Column 6 lines 50-52) The ionized metallic atoms pass through a conductive mesh before reaching a wafer such that the ionized metallic atoms are able to decelerate due to the negative bias of the mesh 44 and 42. (Column 9 lines 5-62)

Regarding claim 12, the ionized metallic atoms accelerate at a second rate through the conductive mesh due to the negative voltage applied to the mesh. The second rate would be less than the first acceleration rate because the negative voltage of the mesh would decelerate the positive metallic atoms. A metallic thin film is formed. (Abstract; Column 7 lines 4-32; Column 6 lines 50-52; Column 9 lines 5-62)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7, 10, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandhu (U.S. Pat. 6,752,912) in view of Katsuki et al. (U.S. Pat. 5,728,276).

Regarding claim 7, Sandhu teach an ionized physical vapor deposition process comprising the steps of providing a plasma reaction chamber 10 having a target 16 and a wafer pedestal 14 set up within the chamber. An ionization unit 32 is set up between the target and the wafer pedestal 14 and a conductive mesh 40 is set up between the ionization unit and the wafer pedestal 14. (Column 6 lines 7-22; Column 7 lines 4-32; Column 8 lines 47-67; Column 9 lines 1-62) A wafer is placed on a pedestal. (Column 6 lines 7-22) A negative bias voltage is applied to the target. (Column 6 lines 45-49) A negative bias is placed on the mesh for depositing a film on a wafer. (Column 9 lines 22-62) The negative voltage to be applied to mesh 44 is 500 to 5000 volts. The negative voltage to be applied to mesh 46 is 50 to 500 volts. (Column 9 lines 41-47)

The difference between Sandhu and the present claims is that the negative bias voltage applied to the target being greater than the bias applied to the conductive mesh is not discussed (Claim 7) and utilizing a reactive gas is not discussed (Claims 10, 13).

Art Unit: 1753

Regarding claim 7, Katsuki et al. teach providing a target with a DC voltage of – 700 V. (Column 6 lines 25-27) The bias to the mesh can be a voltage of –30 V. (Column 6 lines 18-22)

The motivation for applying a lower negative voltage to the mesh than to the target is that it allows for control of layer thickness. (Column 2 lines 42-47)

Katsuki et al. teach utilizing a reactive gas. (Column 5 lines 51-55)

The motivation for utilizing a reactive gas is that it allows depositing a reactive thin film. (Column 5 lines 51-55)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Sandhu by utilizing a lower negative voltage to the mesh than to the target and to have utilized a reactive gas as taught by Katsuki et al. because it allows for controlling the layer thickness and depositing a reactive thin film.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandhu in view of Katsuki et al. as applied to claims 7, 10 and 13 above, and further in view of Givens et al. (U.S. Pat. 5,807,467).

The differences not yet discussed is that initially depositing a thin film over the wafer without applying any bias to the mesh and then applying a negative bias voltage to the mesh while forming a thin film (Claim 8) and wherein the film layer has a thickness between 20% to 30% of the ultimate thickness of the thin film. (Claim 9).

Regarding claim 8, Givens et al. teach depositing a layer 16 by sputtering and then sputter depositing a layer 18 by utilizing a bias to a collimator in order to reduce

Art Unit: 1753

cusping at the corners. (Column 2 lines 26-44; Column 8 lines 65-68; Column 9 lines 1-7; Column 9 lines 24-36)

Regarding claim 9, in Fig 6 it appears that layer 16 is 20% to 30% of the thickness of layer 18. (See Fig. 6)

The motivation for utilizing the features of Givens et al. is that it allows for preventing cusping. (Column 9 lines 5-7)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Givens et al. because it allows for preventing cusping.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

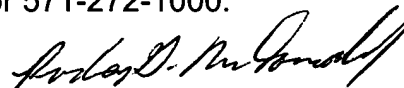
Tadashi (Japan 08-176818) teach an ionized physical vapor deposition process where a coil is utilized as an ionization element. An additional electrode is utilized as well.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1753

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rodney G. McDonald  
Primary Examiner  
Art Unit 1753

RM  
August 10, 2006